

# PALM-BASED CHOCOLATE FUDGE SAUCE FOR DESSERT TOPPING

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**F**udge sauce is an ideal topping for ice cream and cold desserts (Figure 1). It is also used in bakeries and dairy industries for flavouring, dipping and also for inclusion in filling cream and chilled desserts such as yoghurt. Fudge sauce tastes like milk chocolate and is the second most popular topping after chocolate syrup (Schuman, 1984). It is rich and creamy and has a smooth texture. The sauce is semi-liquid and exhibits flow consistency at its pouring temperature but sets readily on the cold desserts (Smagula and Tancredi, 1991).

## PRODUCT

### Composition

The sauce contains sugar, milk, water, cocoa powder, cocoa liquor, fat and oil, emulsifier and stabilizer. The fat ranges from 4%-11%. Fat and oil are necessary to give the desired mouth-feel with the



Figure 1.

choice based on the fat/oil melting characteristics, flavour, cost and oxidative stability. A suitable fat should exhibit the solid fat profile as in Figure 2.

### Novelty of the Product

The novelty of the product which is a blend of fractionated palm-based products. It is non-lauric and *trans*-free, the characteristics much sought after in today's market. Most commercial samples use lauric fats and are therefore high in saturated fatty acids (Table 1, commercial samples 1, 2 and 3). Commercial sample No. 4 (Table 1), a non-lauric-based formulation, is high in *trans* fatty acids arising from the use of hydrogenated soyabean oil. This is deemed unsuitable in the current commercial world.

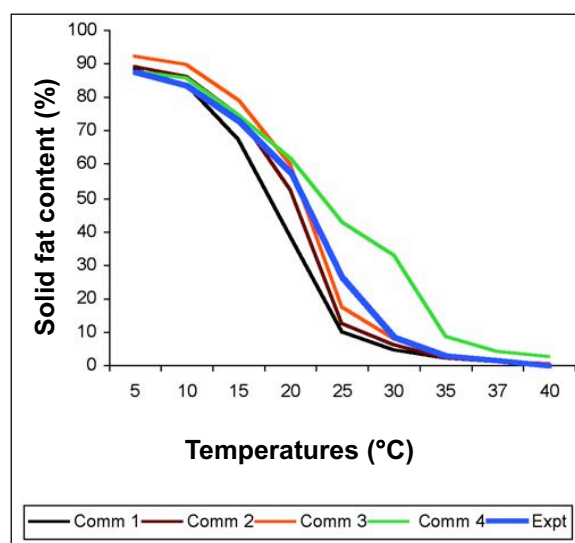


Figure 2. Solid fat profile of experimental and commercial fats for fudge sauce.

TABLE 1. FATTY ACID COMPOSITION OF HOT FUDGE FATS

Fatty acid	Expt 1	Comm. 1	Comm. 2	Comm. 3	Comm. 4
12:0	0.1	44.2	45.6	47.6	0.6
14:0	1.0	16.6	16.3	17.1	0.5
16:0	51.5	9.7	9.0	8.3	12.8
18:0	5.1	11.0	10.9	10.2	10.4
18:1	35.8	2.2	2.50	1.0	72.9
18:2	5.8	0.4	0.3	0.2	1.1
<i>Trans</i>	None	0.6	0.2	1.0	36.0
Saturated	57.7	97.1	88.2	98.3	24.3



### Product Characteristics

It is important that the fudge sauce exhibits a flowable consistency at its application temperature, then becomes firm or sets readily on the dessert, has a smooth texture and pleasant taste. The viscosity and setting time of the experimental formulation were comparable to those of the commercial products as shown in *Table 2*.

**TABLE 2. VISCOSITY AND SETTING TIMES OF EXPERIMENTAL AND COMMERCIAL FUDGE SAUCES**

Viscosity at 40°C (cps)	Setting time (s)
Experimental sauce 7.24x10 <sup>3</sup>	21-23
Commercial 1 6.26x10 <sup>3</sup>	20-23
Commercial 2 7.26 x10 <sup>3</sup>	20-21
Commercial 3 7.24 x10 <sup>3</sup>	20-21
Commercial 4 7.24 x10 <sup>3</sup>	20-21

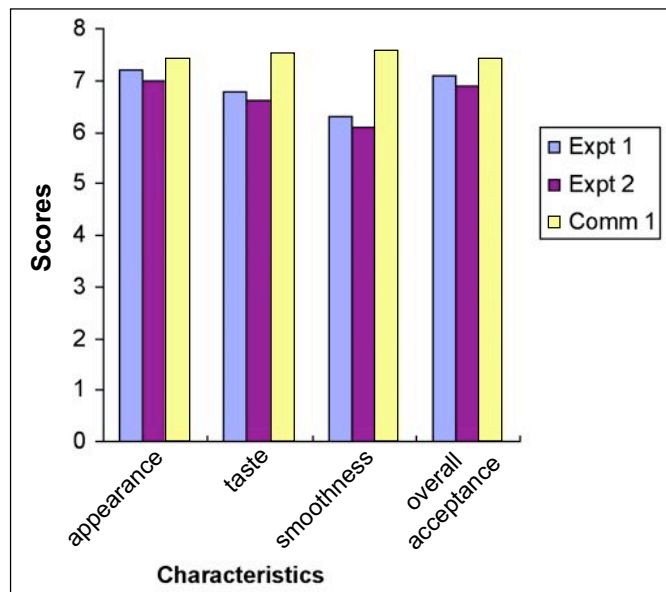
Note: Setting time was evaluated by pouring hot fudge sauce (40°C) on ice cream.

### Sensory Evaluations

The experimental and commercial samples were evaluated for appearance, taste, smoothness and overall acceptance by a trained panel. The results of the sensory evaluation are presented in *Figure 3*. They showed that the experimental fudge sauce was well received by trained panel.

### MARKET POTENTIAL

Fudge sauces are widely used in fast food outlets, hotels and households. In Malaysia, the product is mostly imported. It, however, can be produced locally and the potential producer would be a small-and medium-scale manufacturer who already has the facilities for making chocolate products or sauces. For international markets, the proposed formulation could be used to replace partially hydrogenated liquid oils or lauric-based fats.



*Figure 3. Scores for sensory evaluation of experimental and commercial fudge sauces.*

Notes: Appearance: 1 = very unattractive, 9 = very attractive.  
 Taste: 1 = very poor, 9 = very good  
 Smoothness: 1 = very grainy, 9 = very smooth.  
 Overall evaluation: 1 = dislike extremely, 9 = like extremely.

### COMMERCIAL POTENTIAL

Full production 48 t per year  
 Cost of production RM 5/500 g bottle  
 Selling price RM 6 per bottle  
 For 10 years running: NPV: 536 547  
 Benefit: cost ratio: 1.20

### REFERENCES

SMAGULA, M S and TANCREDI, M R (1991). US patent 5 011 704.  
 SCHUMAN, R (1984). Dessert topping technology. *P.M.C.A. Production Conference*, 38: 71-75.

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